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LISTS OF SPECIES

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Fishes from Parque Estadual de Itapeva, Rio Grande do Sul state, Atlantic Forest biome, Brazil

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Abstract: The ichthyofauna herein presented was collected in streams, lake, and swamps from the Parque Estadual de Itapeva, Rio Mampituba basin. The protected area is located in the northernmost part of the coastal plain of Rio Grande do Sul state. Samplings resulted in 26 species, in 20 genera, 15 families, and six orders. Two species are listed as threatened and one near threatened in Rio Grande do Sul. This study represents the first fish survey in the protected area, Atlantic Forest biome.

Key words: ichthyofauna; coastal plain; conservation unit; Rio Mampituba

INTRODUCTION

In Rio Grande do Sul state (RS) there are 23 state conservation units of public administration managed by Secretary of Environment and Sustainable Development (Secretaria do Ambiente e Desenvolvimento Sustentável, SEMA), totaling about 300,000 ha (3,000 km^2) of protected area. Many watercourses occur in all of these protected areas and few ichthyofaunistic studies have been done to determine the number of species or to evaluate conservation status of these species. According to Reis et al. (2003a, 2003b) 325 freshwater fish species occur in Rio Grande do Sul state, but this number is likely underestimated. In the past decade dozens of new species have been described, and it is estimated that the number can exceed four hundred species (Bertaco et al. 2016).

The Parque Estadual de Itapeva (PEVA), created in December 2002 (State Decree 42.009/2002), is located in the northernmost part of the coastal plain of Rio Grande do Sul. It contains remnants of the Atlantic Forest, a biome strongly impacted by deforestation and pollution caused by increased urbanization (Menezes et al. 2007). The majority of the watercourses that are within of the limits of park, as well as in the surrounding area to the north of the conservation unit, are part of the Rio Mampituba basin.

The objective of this study is to provide an ichthyofaunistic inventory, which may eventually support future studies on fish biology and conservation of a poorly known and protected area.

MATERIALS AND METHODS

Study site

The PEVA comprises mobile and fixed dunes, grasslands, marshy forest, dry forests, a lake, small streams and swamps. The protected area is a state conservation unit in the Integral Protection category, with an area of approximately 1,000 hectares located in the Atlantic Forest biome, at the Municipality of Torres, RS. The climate in the region is subtropical characterized by rainy winters and hot summers. A total of six sampling points were used in the streams, swamps and lake of the PEVA (Figures 1–2, Table 1). All these watercourses are in the Rio Mampituba basin (boundary between Rio Grande do Sul and Santa Catarina states).

Data collection

Specimens were collected between 7 to 9 December, 2005, using a dip net (40 × 80 cm frame and 1 mm net mesh size), gill nets (20 m × 1.8 m, 2–4 cm between knots), casting net (2 m × 1.5 cm between knots) and seine net (10 m × 2 m, 5 mm between knots). The nets were selected according to the environmental and hydrological conditions of the sampling sites. Gill nets were set for 12 to 14 h. The fishes were collected for the management plan of PEVA under permission of the Department of Forest and Protected Areas (Departamento de Florestas e Áreas Protegidas, DEFAP) of SEMA, permit number IBAMA 02023–000282/04–82. The specimens collected were fixed in 10% formalin, preserved in 70% alcohol and later identified using Malabarba et al. (2013), Giora and Malabarba (2016) and Lucena and Soares (2016).

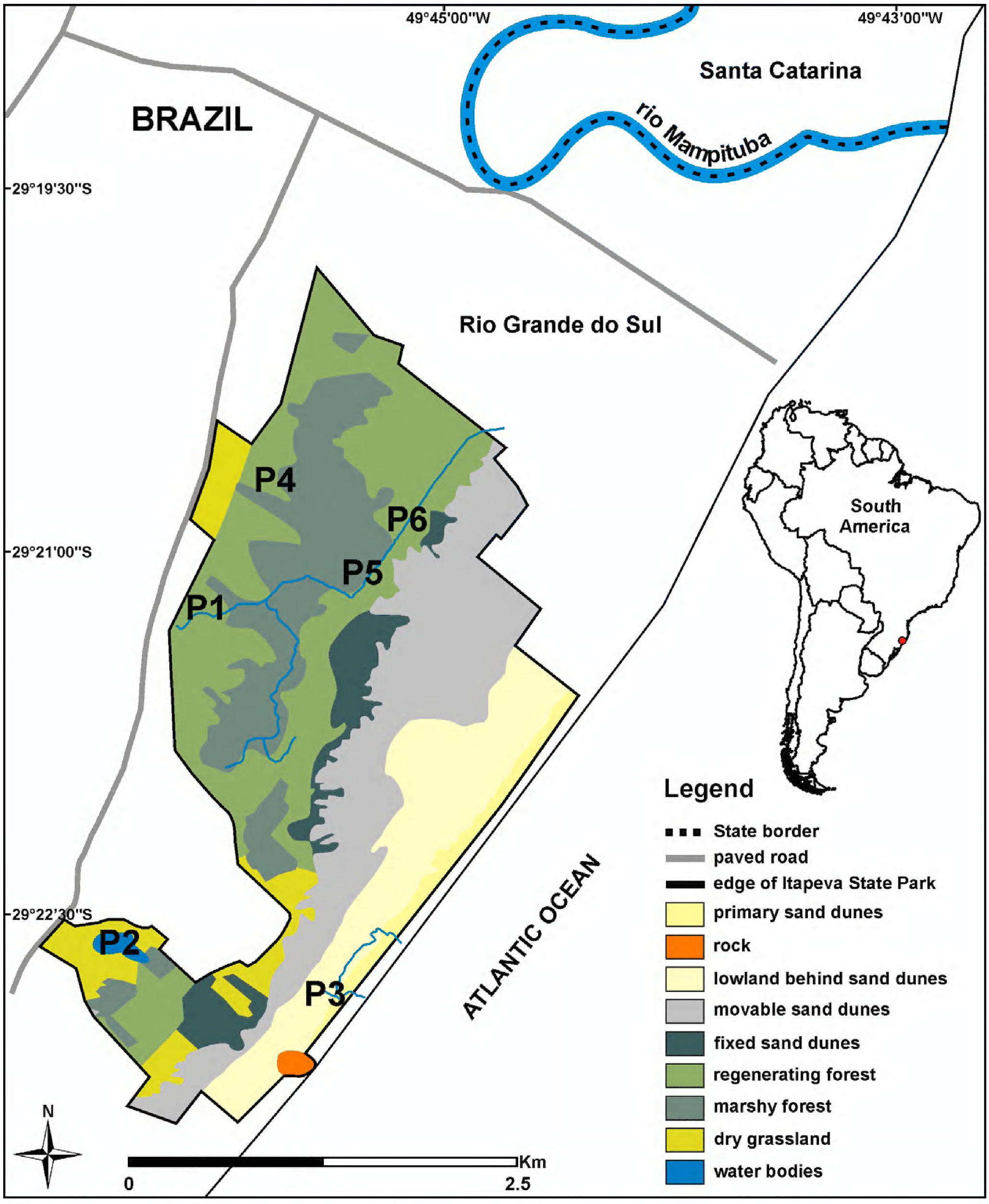

Figure 1. Study area showing the collection sites in the Parque Estadual de Itapeva, Rio Grande do Sul state, Brazil. The red dot in the South America map indicates the conservation unit.

Photos and brief diagnosis are provided for a group of species, including endangered, endemic, belonging to species complex, and recently described.

Voucher specimens are housed in the Coleção de Peixes do Museu de Ciências Naturais (MCN), Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre (Table 2). In addition to the specimens collected during this inventory, species records from the fish collection

Table 1. List of sampling sites and sampling methods used in the Parque Estadual de Itapeva, Torres, Rio Grande do Sul state, Brazil.

Sites	Sampling points	Coordinates	Sampling Methods
1	Stream and peatland	29°21′22″ S, 049°45′55″ W	Casting and dip nets
2	Simão Lake	29°22′31″ S, 049°46′16″ W	Gill, seine and casting nets
3	Creek in eastern state park	29°22′48″ S, 049°45′25″ W	Dip net
4	Swamp in peatland and creek in the marshy forest	29°20′58″ S, 049°45′38″ W	Dip net
5	Creek in the marshy forest	29°21′16″ S, 049°45′14″ W	Dip net
6	Stream near wood bridge	29°21′04″ S, 049°45′04″ W	Dip net

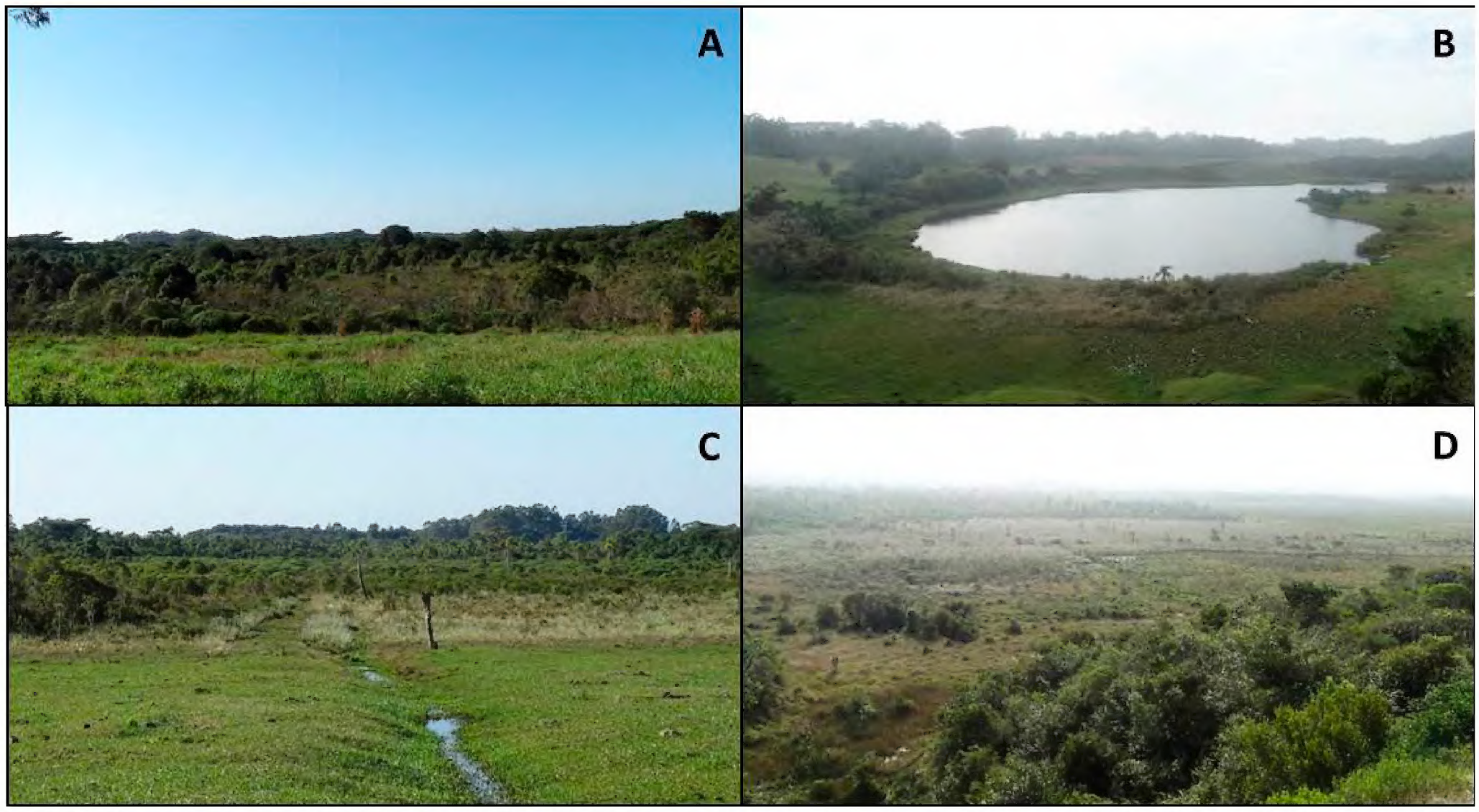

Figure 2. Sampled habitats in the Parque Estadual de Itapeva. (**A**) Stream and peatland (P1); (**B**) Simão Lake (P2); (**C**) Swamp in peatland and creek in marshy forest (P4); (**D**) Stream near wooden bridge (P6).

from the Departamento de Zoologia da Universidade Federal do Rio Grande do Sul (UFRGS), available at the SpeciesLink (http://www.splink.org.br), and the database of MCN fish collection were also used. The classification of fishes followed Reis et al. (2003a), except for Cichliformes *sensu* Wiley and Johnson (2010). The common names followed Malabarba et al. (2013). The respective capture habitat (e.g. "stream" for species collected in streams) for each species is given in Table 2.

RESULTS

Four hundred and fifteen fish specimens, belonging to six orders, 15 families, 20 genera, and 26 species were collected (Figures 3–5, Table 2). All species are native to the Rio Mampituba basin. Among the specimens collected, 41.4% were Characiformes, 25% Cyprinodontiformes, 20% Cichliformes, 6.7% Siluriformes, 5.5% Gymnotiformes, and 1% Synbranchiformes. The most abundant species was *Hyphessobrycon luetkenii* (Boulenger, 1887) (17.5%), *Phalloceros spiloura* Lucinda, 2008 (17.1%), and *Geophagus brasiliensis* (Quoy & Gaimard, 1824) (13.2%).

Most of the sampled species occurred both in streams and swamps, and four species are found only in Simão Lake (*Australoheros* cf. *facetus* (Jenyns, 1842), *Cyphocharax saladensis* (Meinken, 1933), *Hyphessobrycon igneus* Miquelarena, Menni, López & Casciotta, 1980, and *Phalloceros caudimaculatus* (Hensel, 1868, Table 2). All these species prefer lentic environments typical of lakes.

Among the species collected, only two are considered threatened in RS (State Decree 51.797/ 2014), *Atlantirivulus riograndensis* (Costa & Lanés, 2009) (Rivulidae) and *Gymnotus refugio* Giora & Malabarba, 2016 (Gymnotidae), the latter mentioned as *G.* aff. *pantherinus* (Steindachner, 1908) in Malabarba et al. (2013). We also collected a species in the "Near Threatened" category, *Mimagoniates rheocharis* Menezes & Weitzman, 1990.

The species, categorized as endangered, endemic, belonging to a species complex, recently described and/ or had the nomenclature changed, are briefly discussed below.

Table 2. List of fish species collected in the Parque Estadual de Itapeva, Torres, Rio Grande do Sul state, Brazil and their respective capture area.

ORDER/ Family/ *Species*	Popular name	Creek Stream	Simão Lake	Swamp	Voucher
CHARACIFORMES					
Characidae					
Astyanax eigenmanniorum (Cope, 1894)	Lambari-de-olho-vermelho	X			UFRGS 9449
Astyanax lacustris (Lütken, 1875)	Lambari-do-rabo-amarelo	X		X	MCN 18451
Hyphessobrycon boulengeri (Eigenmann, 1907)	Lambari-prata	X		X	MCN 18472
Hyphessobrycon igneus Miquelarena, Menni, López & Casciotta, 1980	Lambari-limão		X		MCN 18462
Hyphessobrycon luetkenii (Boulenger, 1887)	Lambari-vírgula	X	X	X	MCN 18464
Mimagoniates microlepis (Steindachner, 1877)	Lambari-azul	X		X	MCN 18475
Mimagoniates rheocharis Menezes & Weitzman, 1990	Lambari-da-sombra	X			MCN 18484
Curimatidae					
Cyphocharax saladensis (Meinken, 1933)	Biruzinho-do-banhado		X		MCN 18461
Erythrinidae					
Hoplias malabaricus (Bloch, 1794)	Traíra	X			UFRGS 8669
SILURIFORMES					
Callichthyidae					
Callichthys callichthys (Linnaeus, 1758)	Tamboatá	X		X	MCN 18469
Loricariidae					
Otothyris rostrata Garavello, Bristki & Schaefer, 1998	Cascudinho-de-crista	X			MCN 18493
Pseudopimelodidae					
Microglanis cibelae Malabarba & Mahler, 1998	Bagrinho-malhado	X			MCN 18494
Heptapteridae					
Rhamdia aff. *quelen* (Quoy & Gaimard, 1824)	Jundiá	X			MCN 18495
GYMNOTIFORMES					
Gymnotidae					
Gymnotus aff. *carapo* Linnaeus, 1758	Tuvira-tigre	X		X	MCN 18477
Gymnotus refugio Giora & Malabarba, 2016	Tuvira-pantera-negra	X		X	MCN 18476
Hypopomidae					
Brachyhypopomus gauderio Giora & Malabarba, 2009	Tuvira-de-sela	X			MCN 18491
Sternopygidae					
Eigenmannia trilineata López & Castello, 1966	Peixe-faca	X			MCN 18492
CYPRINODONTIFORMES					
Anablepidae					
Jenynsia multidentata (Jenyns, 1842)	Barrigudinho-listrado	X			UFRGS 8677
Poeciliidae					
Phalloceros caudimaculatus (Hensel, 1868)	Barrigudinho		X	X	MCN 18465
Phalloceros spiloura Lucinda, 2008	Barrigudinho	X		X	MCN 18468
Rivulidae					
Atlantirivulus riograndensis (Costa & Lanés, 2009)	Killifish-sulino	X		X	MCN 18473
SYNBRANCHIFORMES					
Synbranchidae					
Synbranchus aff. *marmoratus* Bloch, 1795	Muçum	X		X	MCN 18488
CICHLIFORMES					
Cichlidae					
Australoheros cf. *facetus* (Jenyns, 1842)	Cará-amarelo		X		MCN 18459
Cichlasoma portalegrense (Hensel, 1870)	Cará-do-lodo	X	X	X	MCN 18487
Crenicichla lepidota Heckel, 1840	Joaninha	X	X	X	MCN 18460
Geophagus brasiliensis (Quoy & Gaimard, 1824)	Cará-cartola	X	X		MCN 18463

Phylum Chordata
Class Actinopterygii
Order Characiformes
Family Characidae

Astyanax eigenmanniorum (Cope, 1894): Figure 3A

Tetragonopterus eigenmanniorum Cope (1894): 89.
Astyanax eigenmanniorum (Cope, 1894). — Lucena et al. (2013): 549; Malabarba et al. (2013): 29.

Material examined: Table 2

Astyanax eigenmanniorum differs from its congeners by the presence of a humeral spot forming a uniform wedge, 34 to 36 perforated scales along the lateral line, 20 to 25 branched anal-fin rays and only one maxillary tooth (Lucena et al. 2013).

Astyanax lacustris (Lütken, 1875): Figure 3B

Tetragonopterus lacustris Lütken (1875): 131.
Astyanax lacustris (Lütken, 1875). — Lucena and Soares (2016): 103.
Astyanax jacuhiensis (Cope, 1894): 88. — Lima et al. (2003): 111;

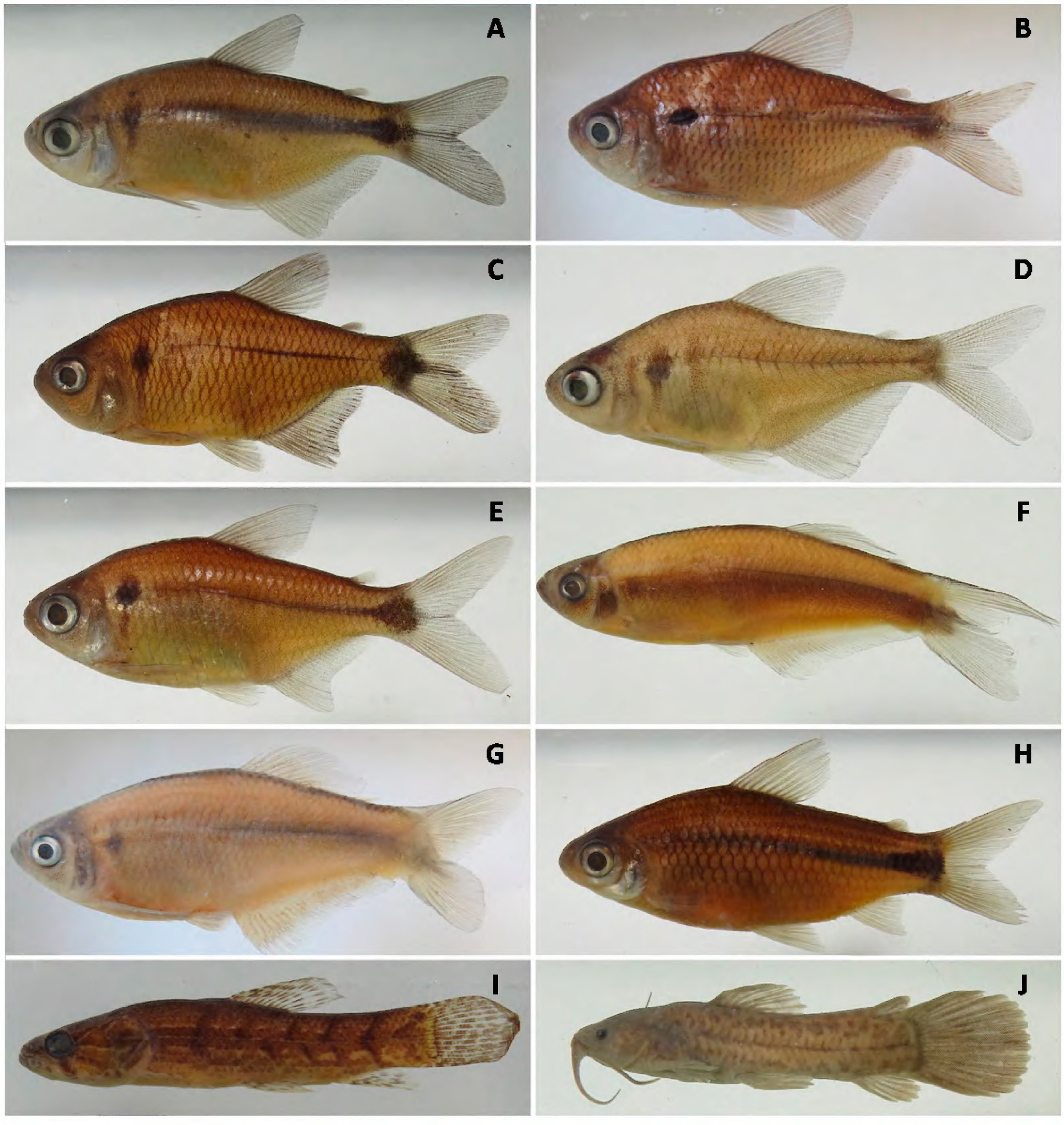

Figure 3. Species of fishes of the Parque Estadual de Itapeva, Rio Grande do Sul state, Brazil. (**A**) *Astyanax eigenmanniorum*, 46.2 mm SL, male, UFRGS 9449; (**B**) *Astyanax lacustris*, 50.1 mm SL, MCN 18451; (**C**) *Hyphessobrycon boulengeri*, 34.0 mm SL, MCN 18472; (**D**) *Hyphessobrycon igneus*, 29.1 mm SL, female, MCN 18462; (**E**) *Hyphessobrycon luetkenii*, 44.1 mm SL, MCN 18464; (**F**) *Mimagoniates microlepis*, 42.2 mm SL, male, MCN 18475; (**G**) *Mimagoniates rheocharis*, 49.0 mm SL, male, MCN 18484; (**H**) *Cyphocharax saladensis*, 59.1 mm SL, MCN 18461; (**I**) *Hoplias malabaricus*, 70.0 mm SL, UFRGS 8669; (**J**) *Callichthys callichthys*, 26.0 mm SL, MCN 18469.

Lucena et al. (2013): 548; Malabarba et al. (2013): 31; Lucena and Soares (2016): 103.

Material examined: Table 2

This species belongs to the *A. bimaculatus* species group (Garutti and Britski 2000) and can be distinguished from other species of this group by the absence of a conspicuous midlateral black stripe, presence of caudal peduncle spot, and absence of maxillary teeth. It was recently redescribed by Lucena and Soares (2016), and represents the only species of the group in the coastal rivers of southern Brazil.

Hyphessobrycon boulengeri (Eigenmann, 1907): Figure 3C

Hemigrammus boulengeri Eigenmann (1907): 15.

Hyphessobrycon boulengeri (Eigenmann, 1907). — Malabarba et al. (2013): 40.

Material examined: Table 2

It may be distinguished from congeners by the presence of a vertically elongate and relatively rounded humeral spot, a narrow midlateral dark stripe on the flank, body with reticulated pattern formed by chromatophores concentrated on posterior margin of scales, and a narrow stripe on anal-fin base (Carvalho 2006).

Hyphessobrycon igneus Miquelarena, Menni, López & Casciotta, 1980: Figure 3D

Hyphessobrycon igneus Miquelarena, Menni, López & Casciotta (1980): 237. — Malabarba et al. (2013): 41.

Material examined: Table 2

The most distinctive characters of this species are the presence of two vertically elongate humeral spots, presence of faint black midline with some transverse bars anteriorly directed and chevron shaped along myomeres junction, and the sexual dimorphism of the color pattern (dorsal, anal and caudal fins reddish in females and yellowish in males).

Hyphessobrycon luetkenii (Boulenger, 1887): Figure 3E

Tetragonopterus luetkenii Boulenger (1887): 173.

Hyphessobrycon luetkenii (Boulenger, 1887). — Malabarba et al. (2013): 42.

Material examined: Table 2

Mimagoniates microlepis (Steindachner, 1877): Figure 3F

Paragoniates microlepis Steindachner (1877): 591.

Mimagoniates microlepis (Steindachner, 1877). — Menezes and Weitzman (2009): 355; Malabarba et al. (2013): 46; Azevedo et al. (2016): 2.

Material examined: Table 2

Mimagoniates rheocharis Menezes & Weitzman, 1990: Figure 3G

Mimagoniates rheocharis Menezes & Weitzman (1990): 399. — Menezes and Weitzman (2009): 350; Malabarba et al. (2013): 47; Azevedo et al. (2016): 2.

Material examined: Table 2

It may be distinguished from the sympatric species *Mimagoniates microlepis* by the smaller number of branched anal-fin rays (usually 24–26 *versus* 28–31), larger number of scale rows between dorsal- and anal-fin origins (17–22 *versus* 14–17), and smaller number of scale rows around caudal peduncle (19–23 *versus* 15–18). Additionally, according to Azevedo et al. (2016), *M. rheocharis* and *M. microlepis* have the lowest absolute mean fecundity known for characids, indicating that inseminating species allocate less energy to oocyte production and reinforcing the hypothesis that insemination has an adaptive advantage, which provides a higher chance of fertilization. Category "Near Threatened" (NT) according to State Decree 51.797/2014.

Family Curimatidae

Cyphocharax saladensis (Meinken, 1933): Figure 3H

Curimatopsis saladensis Meinken (1933): 71.

Cyphocharax saladensis (Meinken, 1933). — Malabarba et al. (2013): 54.

Material examined: Table 2

It is diagnosed from its congeners by the incomplete lateral line with 8 to 9 perforated scales, and by the presence of a conspicuous black caudal-peduncle spot.

Family Erythrinidae

Hoplias malabaricus (Bloch, 1794): Figure 3I

Esox malabaricus Bloch (1794): 149.

Hoplias malabaricus (Bloch, 1794). — Oyakawa and Mattox (2009): 119; Malabarba et al. (2013): 57.

Material examined: Table 2

Order Siluriformes

Family Callichthyidae

Callichthys callichthys (Linnaeus, 1758): Figure 3J

Silurus callichthys Linnaeus (1758): 307.

Callichthys callichthys (Linnaeus, 1758). — Malabarba et al. (2013): 64.

Material examined: Table 2

Family Loricariidae

Otothyris rostrata Garavello, Bristki & Schaefer, 1998: Figure 4A

Otothyris rostrata Garavello, Bristki & Schaefer (1998): 10. — Garavello et al. (1998): 4; Malabarba et al. (2013): 80.

Material examined: Table 2

Family Pseudopimelodidae

Microglanis cibelae Malabarba & Mahler, 1998: Figure 4B

Microglanis cibelae Malabarba & Mahler (1998): 249. — Bertaco and Cardoso (2005): 65; Malabarba et al. (2013): 87.

Material examined: Table 2

Microglanis cibelae is the most elongate *Microglanis* species from southern Brazil and exhibits almost completely black pectoral- and pelvic-fins (Malabarba and Mahler 1998). It differs from congeners in southern Brazil by having smaller head length (25.1–28.9% *versus* 29.6–33.5% SL in *M. cottoides*), smaller mouth width (50.5–65.2% *versus* 67.3-84.4% HL in *M. eurystoma*), and smaller body width (22.3–26.0% *versus* 29.3-33.1% SL in *M. malabarbai*) (Bertaco and Cardoso 2005).

Family Heptapteridae

Rhamdia aff. ***quelen*** (Quoy & Gaimard, 1824): Figure 4C

Pimelodus quelen Quoy & Gaimard (1824): 228.

Rhamdia quelen (Quoy & Gaimard, 1824). — Silfvergrip (1996): 95;

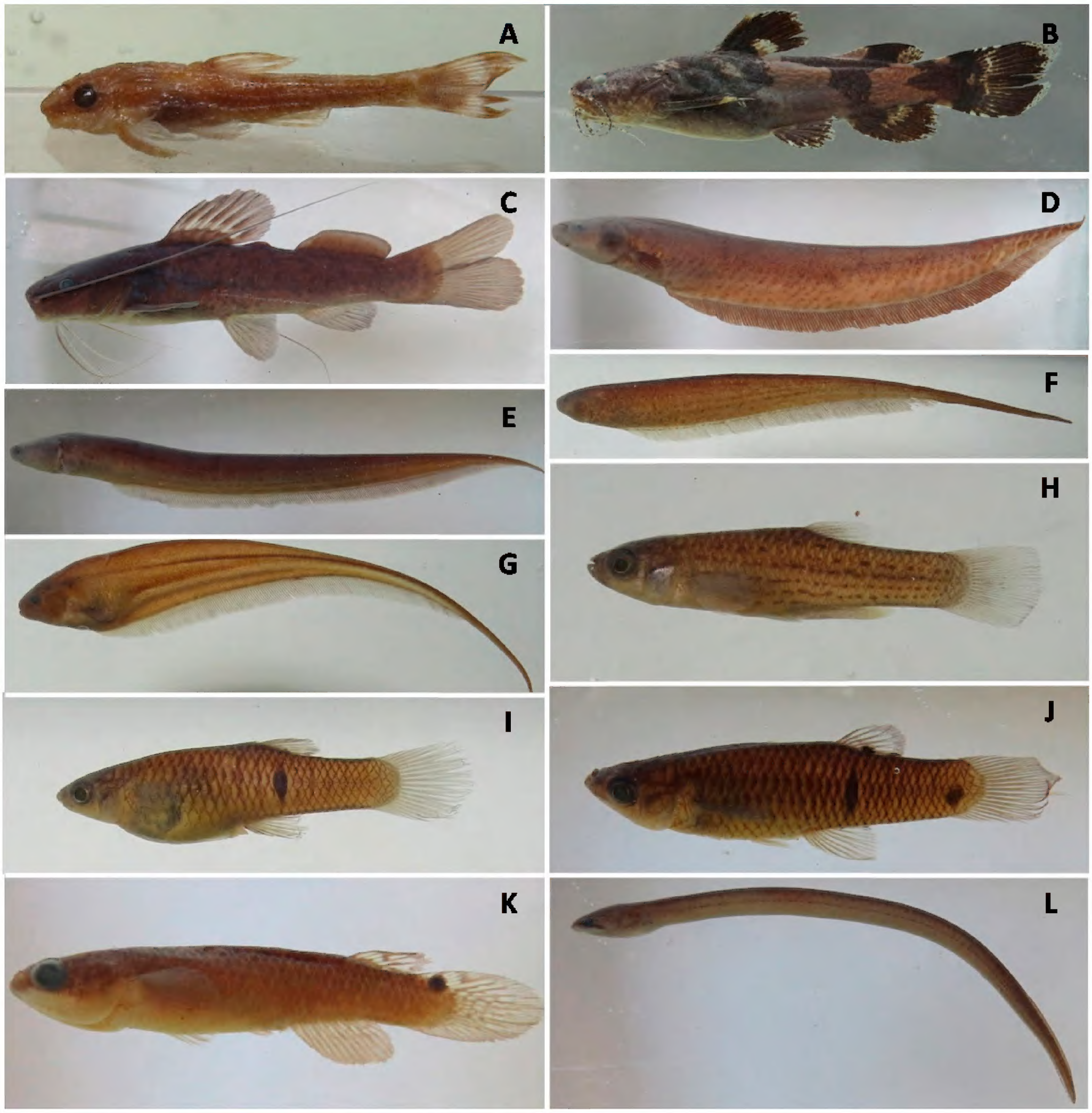

Figure 4. Species of fishes of the Parque Estadual de Itapeva, Rio Grande do Sul state, Brazil. (**A**) *Otothyris rostrata*, 25.1 mm SL, MCN 18493; (**B**) *Microglanis cibelae*, 44.2 mm SL, MCN 18494; (**C**) *Rhamdia* aff. *quelen*, 118.0 mm SL, MCN 18495; (**D**) *Gymnotus* aff. *carapo*, 183.0 mm TL, MCN 18477; (**E**) *Gymnotus refugio*, 125.0 mm TL, MCN 18476; (**F**) *Brachyhypopomus gauderio*, 111.0 mm TL, MCN 18491; (**G**) *Eigenmannia trilineata*, 125 mm TL, MCN 18492; (**H**) *Jenynsia multidentata*, 27.2 mm SL, male, UFRGS 8677; (**I**) *Phalloceros caudimaculatus*, 33.0 mm SL, female, MCN 18465; (**J**) *Phalloceros spiloura*, 32.0 mm SL, female, MCN 18468; (**K**) *Atlantirivulus riograndensis*, 26.0 mm SL, female, MCN 18473; (**L**) *Synbranchus* aff. *marmoratus*, 85.0 mm TL, MCN 18488.

Ferraris (2007): 200; Malabarba et al. (2013): 73.

Material examined: Table 2

Rhamdia quelen belongs to one of the largest species complexes of fishes and is widely distributed in the Neotropical region. The coastal populations of *Rhamdia* from southern Brazil have distinct features and probably represent a new species (Malabarba et al. 2013).

Order Gymnotiformes
Family Gymnotidae

Gymnotus* aff. *carapo Linnaeus, 1758: Figure 4D

Gymnotus aff. *carapo* Linnaeus (1758): 246. — Albert and Crampton (2003): 7; Malabarba et al. (2013): 94.

Material examined: Table 2

This species belongs to a species complex and is widely distributed in South America (Albert and Crampton 2003). According to these authors, *G. carapo stricto sensu* is from Surinam, and differs from all members of the group by having 16–27 (mean = 22) dark pigment bands obliquely oriented or band-pairs, with irregular wavy margins, often broken into spots above lateral line on anterior half of body. It is possible that the coastal populations of *G. carapo* from southern Brazil is a new species (Albert and Crampton 2003).

Gymnotus refugio Giora & Malabarba, 2016: Figure 4E
Gymnotus refugio Giora & Malabarba (2016): 583.
Gymnotus aff. *pantherinus* (non Steindachner, 1908). — Malabarba et al. (2013): 95.

Material examined: Table 2

This species was recently described by Giora and Malabarba (2016) from coastal rivers of Rio Grande do Sul and Santa Catarina states. It belongs to the *G. pantherinus* species-group and it is distinguished from other group members by its yellow to dark brown ground color with thick and/or vermiculated spots from the anal-fin base to the lateral line. Category "Endangered" (EN) according to State Decree 51.797/ 2014.

Family Hypopomidae

Brachyhypopomus gauderio Giora & Malabarba, 2009: Figure 4F
Brachyhypopomus gauderio Giora & Malabarba (2009): 62. — Malabarba et al. (2013): 97.

Material examined: Table 2

Family Sternopygidae

Eigenmannia trilineata López & Castello, 1966: Figure 4G
Eigenmannia trilineata López & Castello (1966): 8. — Malabarba et al. (2013): 98.

Material examined: Table 2

Order Cyprinodontiformes
Family Anablepidae

Jenynsia multidentata (Jenyns, 1842): Figure 4H
Lebias multidentata Jenyns (1842): 117
Jenynsia multidentata (Jenyns, 1842). — Malabarba et al. (2013): 102.

Material examined: Table 2

Family Poeciliidae

Phalloceros caudimaculatus (Hensel, 1868): Figure 4I
Girardinus caudimaculatus Hensel (1868): 362.
Phalloceros caudimaculatus (Hensel, 1868). — Lucinda (2008): 121; Malabarba et al. (2013): 106.

Material examined: Table 2

Phalloceros spiloura Lucinda, 2008: Figure 4J
Phalloceros spiloura Lucinda (2008): 150. — Bonato and Ferrer (2013): 1545; Malabarba et al. (2013): 107.

Material examined: Table 2

According to Lucinda (2008) *Phalloceros spiloura* is diagnosed from congeners by having a rounded spot located on the lower half of the caudal peduncle close to the base of the lowest caudal-fin rays, a patch of dark pigmentation on the last anal-fin ray of females, and the halves of gonopodial paired appendix straight and perpendicular to ray 3. It was described from coastal drainages of Rio Grande do Sul and Santa Catarina states, rio Uruguay and rio Iguaçu, and recently its geographic distribution was extended to Laguna dos Patos system (Bonato and Ferrer 2013).

Family Rivulidae

Atlantirivulus riograndensis (Costa & Lanés, 2009): Figure 4K
Rivulus riograndensis Costa & Lanés (2009): 92.
Atlantirivulus riograndensis (Costa & Lanés, 2009). — Costa (2011): 244; Malabarba et al. (2013): 110.

Material examined: Table 2

This is the only species of the genus occurring in southern Brazil and differs from congeners by having dark brown dots over the dorsal portion of the flank and dorsum in females. Females have a small dark gray spot on the dorsal portion of caudal-fin base. Category "Endangered" (EN) according to State Decree 51.797/2014.

Order Synbranchiformes
Family Synbranchidae

Synbranchus aff. ***marmoratus*** Bloch, 1795: Figure 4L
Synbranchus marmoratus Bloch (1795): 87. — Favorito et al. (2005): 321; Malabarba et al. (2013): 133.

Material examined: Table 2

This species belongs to a species complex and is widely distributed in river drainages from Mexico to northern Argentina. It can be distinguished from its congeners by the color pattern which consists of more homogeneously distributed spots and marbled pattern along body, and by the number of vertebrae (116–150) (Favorito et al. 2005).

Order Cichliformes
Family Cichlidae

Australoheros cf. ***facetus*** (Jenyns, 1842): Figure 5A
Chromis facetus Jenyns (1842): 104.
Australoheros facetus (Jenyns, 1842): 104. — Říčan and Kullander (2008): 4; Malabarba et al. (2013): 120.

Material examined: Table 2

This species belongs to the *Australoheros facetus* group

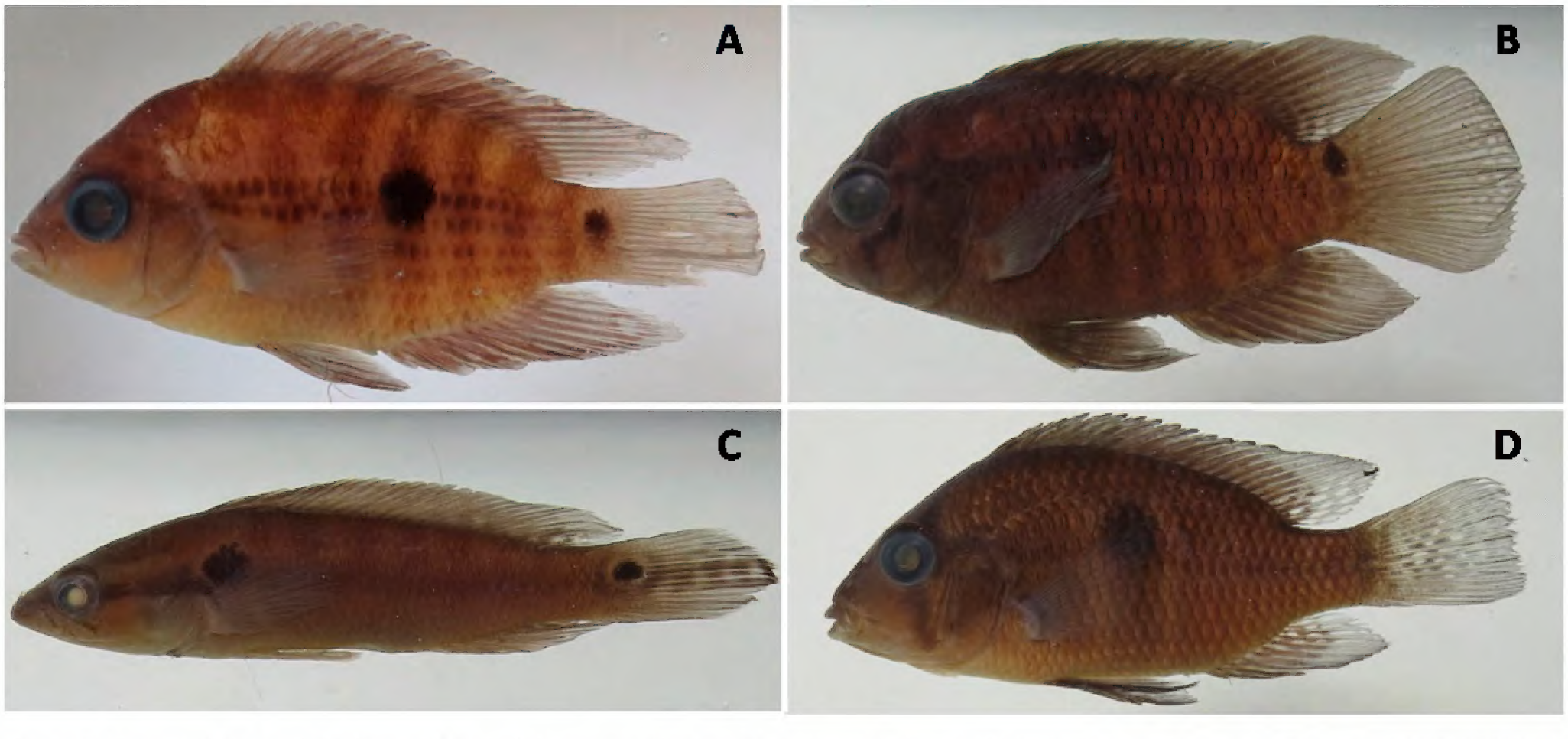

Figure 5. Species of fishes of the Parque Estadual de Itapeva, Rio Grande do Sul state, Brazil. (**A**) *Australoheros* cf. *facetus*, 47.1 mm SL, MCN 18459; (**B**) *Cichlasoma portalegrense*, 45.0 mm SL, MCN 18487; (**C**) *Crenicichla lepidota*, 51.3 mm SL, MCN 18460; (**D**) *Geophagus brasiliensis*, 55.3 mm SL, MCN 18463.

(Říčan and Kullander 2008) and can be distinguished from its congeners by the presence of six anal-fin spines, four abdominal bars, well developed caudal-fin spot, and gray ground color. According to Říčan and Kullander (2008) the coastal populations from southern Brazil are different from *A. facetus* by the color pattern and a combination of meristic characters.

Cichlasoma portalegrense (Hensel, 1870): Figure 5B

Acara portalegrense Hensel (1870): 52.

Cichlasoma portalegrense (Hensel, 1870). — Malabarba et al. (2013): 121.

Material examined: Table 2

It can be distinguished from *Australoheros* cf. *facetus*, a very similar species, by the presence of three anal-fin spines versus six (Říčan and Kullander 2006).

Crenicichla lepidota Heckel, 1840: Figure 5C

Crenicichla lepidota Heckel (1840): 429. — Lucena and Kullander (1992): 101; Malabarba et al. (2013): 122.

Material examined: Table 2

Geophagus brasiliensis (Quoy & Gaimard, 1824): Figure 5D

Chromis brasiliensis Quoy & Gaimard (1824): 266.

Geophagus brasiliensis (Quoy & Gaimard, 1824). — Malabarba et al. (2013): 124.

Material examined: Table 2

DISCUSSION

The total number of freshwater fish species in the Rio Mampituba basin is still unclear, but according to Malabarba et al. (2013) and Bertaco et al. (2016) about 70 species occur in this basin. Based on the results of this inventory, the fish diversity in the watercourses of PEVA is relatively high, comprising 37% (26 species) of the total number of freshwater species estimated for the Rio Mampituba basin. On the other hand, all species recorded in the PEVA are also found in the rio Tramandaí system (Malabarba et al. 2013). This sharing of species is congruent with the freshwater ecoregion Tramandaí-Mampituba recognized by Abell et al. (2008).

According to Vari and Malabarba (1998), Castro (1999) and Lowe-McConnell (1999), the predominance of Characiformes and Siluriformes seems to be a trend for Neotropical rivers, a condition supported in this study with a predominance of Characiformes. The low number of Siluriforms in the catches may be due to the characteristics of the area sampled, such as the absence of rocky substrate, since the bottom is constituted mainly of mud and sand, low current, and abundant aquatic vegetation.

Among the endangered species found in PEVA, *Atlantirivulus riograndensis* and *Gymnotus refugio* are in the category "Endangered" mainly due to its restricted area of distribution and the loss and degradation of their habitats. These species prefer the shallowest parts of small streams, swamps and flooded areas located usually at the border of marshy forest. The species categorized as "Near Threatened", *Mimagoniates rheocharis*, is usually found in lentic environment or slow flowing small streams with clear water in the Atlantic Forest, between southern Santa Catarina and northeastern Rio Grande do Sul states. The species is in this category mainly due to deforestation, water pollution and changes in headwaters, resulting in loss and degradation of habitat. According to Colombo et al. (2008), the main threats in the area of PEVA are forest drainage, habitat fragmentation, and wetland degradation.

The high congruence of the ichthyofauna of PEVA with those of the Mampituba and Tramandaí Rivers,

as well as the presence of threatened species, reinforces the importance of preservation of the conservation unit in the Atlantic Forest biome.

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